CR-AVE Flight Summary
27 January 2006
All times given in CST

General Information

Flight date – 27 January 2006
Flight description – Flight 6 CR-AVE Remote Payload Data Flight (9th flight)
Flight duration - 4.8 hours
Crew – Andrew Roberts, John Bain
Instruments flown (21): 2DS, ACAM, ALIAS, CAFS, CAPS, CO_2, CoSSIR, CPI, CPL, CRS, CSI, Frostpoint, ICOS, JLH, MMS, Ozone, PALMS, PANTHER, PT, Scanning-HIS, WAS

Flight Log

Engine Start	9:47 am	**Takeoff**	10:02 am	**Approach**	2:30 pm
Data Rec On	9:51 am	**Begin Descent**	1:57 pm	**Landing**	2:45 pm

Gear extensions/retractions

Gear Up	10:02 am					
Gear Down	2:43 pm					

Weather Observations

Climb-Out:
- 10:15 am – Sky was very clear on climb-out, with many cumulus clouds and several high layers in the distance. Took four photos.
- 10:38 am – Two photos were taken of an interesting thunderstorm cloud in the distance (left of the aircraft).

Cruise:
- 10:42 am – Six photos were taken of a high layer that became visible in the distance. Four more photos were taken at 11:47 am as the layer became more distinct. We were between 58 and 58.5 kft. The CAPS display indicated 200 and then 1000.
- 10:54 am – We passed over the beginning edge of a very large high layer below us that might have been outflow cirrus. We were 320 nm from waypoint 3 (59 kft). Took three photos. At 11:08 am, four more photos were taken to show the constant high layer below us. We were at 59 kft, and the CAPS display indicated zero. Two more photos were taken at 11:44 am (59 kft), 12 nm from waypoint 3. We had been above a continuous high layer since 10:54 am.
- 11:56 am – During the descent toward waypoint 4, we entered IFR conditions, which lasted until 12:09 pm. We reentered IFR conditions at 12:15pm. By 12:20 pm, we were in hazy, but not IFR, visibility.
- 12:27 pm – We entered a thin cirrus layer. At 12:35 pm, we were past the cirrus clouds, and we started a climb into clear air.
- 12:59 pm – Took four photos of what might have been a high subvisible layer in the distance. We were at 59 kft, and the CAPS display indicated zero.
- 1:20 pm – On the approach to San Jose, the sky was clear, with many clouds near the ground, and a high layer in the distance. Took three photos.
- As we turned toward waypoint 9, the sky over the water was clear to the surface, with the high layer becoming less distinct. Took two photos near waypoint 9 to show the sky clear to the surface with a hazy horizon.

Descent:
- 2:04 pm – During the spiral descent (51 kft), a persistent contrail was observed in the previous half of our turn.
- No clouds were penetrated on final approach to the San Jose airport.

Flight Profile

- We climbed, reaching 59 kft prior to waypoint 3.
- We reached waypoint 3 at 11:46 am (59 kft). We then turned toward waypoint 4 and started a slow descent into the outflow cirrus below. We passed through a thin cirrus layer at 57 kft as we descended. We continued descending in the cirrus, reaching waypoint 4 at 12:04 pm. We then turned back toward Costa Rica in IFR conditions during the descent. We reached 43 kft at 12:32 pm.
- 12:32 pm – The MMS pitch maneuver was initiated at 43 kft.
- The MMS yaw maneuver was initiated at 12:35 pm.
- 12:35 pm – We passed out of the cirrus and started the climb.
- 1:22 pm – We reached waypoint 8 over San Jose, and turned toward waypoint 9.
- 1:34 pm – Crossed waypoint 9 at an altitude of 57 kft, and began a climbing turn.
- 1:43 pm – We reached 60 kft and turned back toward the field. We reached 61 kft at 1:45 pm.
- 1:57 pm – We began a spiral descent over the field. The spoilers were deployed at 1:58 pm.
- 2:06 pm – We leveled off at 49.5 kft and initiated the MMS box maneuver with 30-second legs.
- We continued the spiral descent to 11 kft, and then landed.

Instrument Notes

CAPS

- 10:20 am – The CAPS display initialized, and then went inactive after about eight readings. The clock at the bottom of the display was ticking, but no data were being updated. The CAPS fail sequence was cycled twice; each time the CAPS fail light went out, but the display remained inactive. The CAPS terminal software was closed and reopened without success. The display showed the same sequence of frozen numbers as before. The CAPS fail sequence was tried a third time, and this time the CAPS fail light did not clear after three minutes. A few minutes later, the fail sequence was tried for a fourth time. The CAPS fail light cleared, and the display became active.
- During the descent into the outflow cirrus, the CAPS display indicated many good readings:
  - 11:52 am – Many hits at 52 kft and at 51 kft. In IFR conditions (50 kft), the display was about 60% for hits.
  - 11:56 am – In IFR, 80% hits at 49.5 kft.
  - 11:57 am – In IFR, 90% hits with very large numbers at 49 kft. By 11:58 am, down to 70% hits.
  - 11:59 am – In IFR, 85% hits at 48.5 kft, reaching 100% hits with very large numbers at 12:00 pm.
- 12:01 pm – CAPS fail light illuminated. The fail light cleared after the fail sequence was performed, but the display was frozen. At 12:08 pm, CAPS failed again, shortly after being cleared. It was reset and cleared, but failed again at 12:15 pm. A third fail sequence cleared the light, and the display became active (reading zero).
- 12:20 pm – In hazy conditions, the CAPS display showed 30% hits (46 kft). By 12:25 pm, we were running out of the cirrus, and the CAPS display was reading 5 to 10% hits. By 12:26 pm (25 kft), the CAPS display was reading zero.
- 12:26 pm – CAPS fail light illuminated. When cleared, the display was inactive. At 12:40 pm, the fail sequence was tried again, the fail light cleared, and the display became active. We were at 53 kft, and the display read zero.
- 12:45 pm – CAPS fail light illuminated; cleared with active display.
- 12:50 pm – CAPS fail light. The fail sequence cleared the light at 12:56 pm, and the display became active.
- 1:07 pm – CAPS fail light; cleared with active display.
- 1:15 pm – CAPS fail light; cleared with active display. Then the CAPS fail light illuminated again at 1:18 pm. No further attempts to clear the failure were attempted.

PALMS

- 11:58 am – PALMS Cloud software was activated in IFR conditions.
- 12:35 pm – PALMS Cloud software was turned off after leaving the cirrus cloud.

ALIAS

- 12:00 pm – ALIAS fail light illuminated. The fail sequence cleared the light.
- 12:10 pm – ALIAS fail light illuminated. The fail sequence cleared the light. It failed again at 12:14pm, and was cleared.
- 12:21 pm – ALIAS fail light illuminated. The fail sequence cleared the light. It failed again at 12:26 pm, and was cleared. It failed again at 12:30 pm, and the instrument was turned off.

CPI

- The CPI fail light illuminated for the first time at 12:40 pm. The light was on for about 10 seconds, and then went out. This momentary light occurred several times as follows: 11:45 am, 12:51 pm, 1:02 pm, 1:07 pm, 1:24 pm, 1:35 pm, 1:47 pm, 2:04 pm, and 2:27 pm.